

A.22 River Lamprey (*Lampetra ayresii*)

A.22.1 Legal Status

The river lamprey is not listed under the State or Federal Endangered Species Acts.

A broad group of West Coast conservation organizations petitioned the U.S. Fish and Wildlife Service on January 27, 2003 to list river lamprey, along with three other lamprey species on the West Coast, as threatened or endangered. However, the petition was declined in a 90 day finding on December 27, 2004, citing insufficient evidence that listing was warranted (69 FR 77158).

A.22.2 Species Distribution and Status

Range and Status

The river lamprey occurs from near Juneau, Alaska, to San Francisco Bay, California (Moyle 2002). Outside of California, there are widely scattered and isolated populations throughout its range. River lamprey are common in British Columbia, the center of their geographic range. Within California, river lamprey can be found in the Central Valley, Napa River, Sonoma Creek, Alameda Creek, Salmon Creek, and in tributaries of the lower Russian River (Figure A.22.1). In the Central Valley, river lamprey are found in the lower Sacramento and San Joaquin River drainages, including the Stanislaus and Tuolumne Rivers. They may exist in other tributaries of these rivers, but are easily overlooked and have been the subject of few targeted sampling efforts (Moyle 2002). The species appears to be more abundant in the lower Sacramento-San Joaquin River system than in other streams in California.

Population trends are unknown in California, although declines are thought to have occurred synonymously with freshwater habitat degradation (Moyle 2002).

Distribution and Status in the Planning Area

Individuals outmigrating from Sacramento and San Joaquin River watersheds pass through the Delta on their way to the Pacific Ocean and emigrating adults pass through the Delta on their way upstream towards spawning grounds. The extent to which river lamprey use the Delta for purposes other than a migration corridor is unknown. However, outmigrating lamprey in the final stages of metamorphosis from juveniles (called ammocoetes) to adults hold just upstream of salt water until late spring. Depending on the position of X₂, this location could be within the Planning Area.

Status and trend data are extremely sparse and unreliable. There are no monitoring programs that target river lamprey in the Delta and those that catch river lamprey do not catch them regularly enough to establish trends through time. River lamprey are conspicuous, often overlooked, and ammocoetes can be difficult to distinguish from ammocoetes of the co-occurring Pacific lamprey (*Lampetra tridentata*) (H. Webb, pers. comm).

A.22.3 Habitat Requirements and Special Conditions

The habitat requirements of river lamprey have not been well studied. It is thought that adults need clean, gravelly riffles in permanent streams to spawn successfully. These requirements are

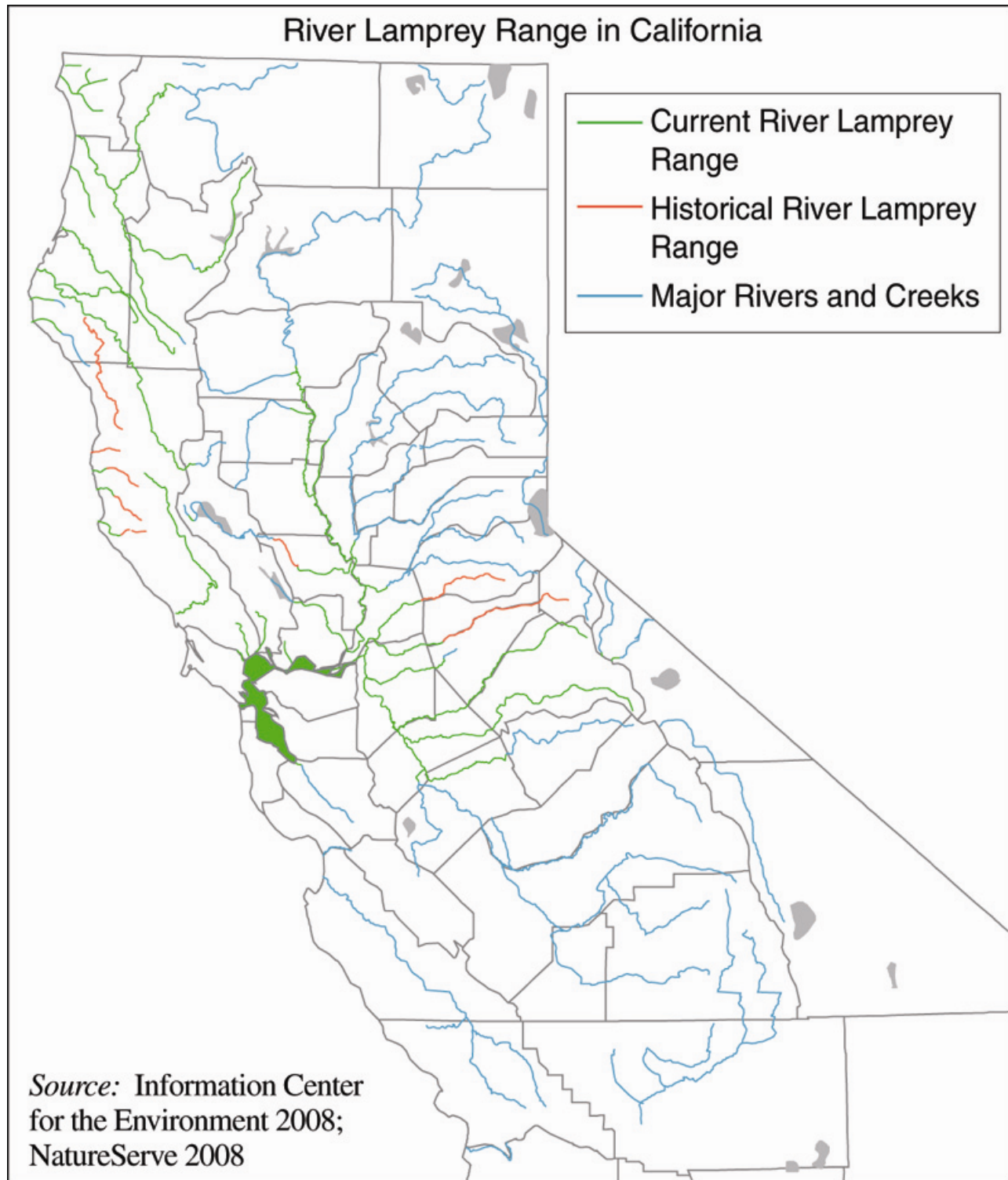


Figure A.22.1 Current and historical range of river lamprey in California

thought to be similar to those of salmonids. Ammocoetes require muddy substrate into which they burrow in silty backwaters and eddies, with water temperatures below 25 °C (Moyle et al. 1995). Lamprey can pass barriers that other fish cannot, although large dams and other habitat modifications remain barriers to migration. They can live in freshwater as adults, as is thought to occur in the land-locked Sonoma Creek.

A.22.4 Life History

The biology of the river lamprey has not been well studied in California. As a result, much of this section is derived from information known for river lamprey from British Columbia. The potential exists for dissimilar life histories between fish in these two locations due to differences in physical factors (e.g., temperature, hydrology).

River lamprey are anadromous, beginning their migration into freshwater in the fall towards suitable spawning areas upstream (Moyle et al. 1995, Moyle 2002). Exact spawning locations are not known, although spawning habitat requirements are thought to be similar to those of salmonids. Spawning occurs from February through May in gravelly riffles in which individuals dig saucer-shaped depressions (Moyle 2002). Adults die after spawning. Fecundity is not well documented, but a study of two females in Cache Creek reported that one female (23 centimeters [cm] total length) produced approximately 11,400 eggs and the other (17.5 cm total length) produced approximately 37,300 eggs (Vladykov and Follett 1958). The eggs hatch into ammocoetes that remain in freshwater for approximately three to five years in silty backwaters or stream edges where they bury into mud and feed on algae and microorganisms.

Ammocoetes begin metamorphosis into adults during summer at approximately 12 cm total length. This process takes nine to ten months and individuals may shrink in length by up to 20 percent (Moyle 2002). Prior to entering the ocean, new adults congregate just upstream of salt water until their esophagus opens (Beamish and Youson 1987). Once opened, new adults can properly osmoregulate and they enter the ocean (Moyle 2002). Adults spend approximately three to four months in the ocean where they grow rapidly to 25 to 31 cm total length. If the ammocoetes stage is three to five years, the total life span of river lamprey is estimated to be six to seven years (Moyle et al. 1995).

River lamprey adults are parasitic during both freshwater and saltwater phases. River lamprey feed on a variety of host fish species that are small to intermediate size (four to 12 inches total length) (Moyle et al 1995), the most common of which are thought to be herring and salmon (Beamish and Youson 1987). In Canada, river lamprey predation is considered to be a significant source of salmon mortality (Beamish and Neville 1995). Individuals feed by attaching to the back of their prey above the lateral line and eating the muscle tissue, even after the host fish dies (Moyle 2002). More than one lamprey can attach to a host salmon (Beamish and Youson 1987).

A.22.5 Threats and Stressors

There have been no formal evaluations conducted that assess the threats and stressors to river lamprey. Therefore, much of the following discussion is based on limited resources. The primary threat to river lamprey is thought to be loss or degradation of habitat through dams, diversions, toxics, stream channelization, dredging, and urbanization (Moyle et al. 1995). Dams have altered flows in channels and limited access to spawning grounds. Toxics may have both lethal and sublethal effects on individuals. Stream channelization, dredging, and diversions have altered flow patterns and rates in channels. Urbanization has degraded habitat by increasing

loads of certain toxics, changing runoff patterns, and altering the configuration of some channels. The altered hydrograph that is expected to result from future climate change may modify the timing of environmental cues upon which river lamprey rely for timing life history events (e.g., outmigration, spawning, etc.).

A.22.6 Relevant Conservation Efforts

There have been very few efforts to conserve river lamprey in the Central Valley of California. The CALFED Ecosystem Restoration Program (ERP) designated the entire lamprey family as “Enhance and/or Conserve” (CALFED Bay-Delta Program 2000). This designation indicates that the ERP will undertake actions to conserve and enhance their abundance and distribution and the community diversity in which they live for their long-term stability.

River lamprey is currently listed as a covered species under the Butte County Habitat Conservation Plan, but specific conservation measures have not yet been written.

A.22.7 Recovery Goals

A recovery plan has not been prepared for this species and no recovery goals have been established.

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Personal Communication

Webb, H. (Field Crew Leader, US Fish and Wildlife Service), Email communication with Rick Wilder about Pacific and river lamprey ammocoete field identification issues, September 11, 2008.

Federal Register Notices Cited

69 FR 77158. 2004. Endangered and Threatened Wildlife and Plants; 90-Day Finding on a Petition To List Three Species of Lampreys as Threatened or Endangered. Federal Register. 69: 77158.